

Environmental Protection Agency

§ 1065.701

(iii) Continuous or batch sampling for each emission.

(iv) Raw or dilute sampling; any dilution-air background sampling.

(v) Duty cycle and test intervals.

(vi) Cold-start, hot-start, warmed-up running.

(vii) Absolute pressure, temperature, and dewpoint of intake and dilution air.

(viii) Simulated engine loads, curb idle transmission torque value.

(ix) Warm-idle speed value.

(x) Simulated vehicle signals applied during testing.

(xi) Bypassed governor controls during testing.

(xii) Date, time, and location of test (e.g., dynamometer laboratory identification).

(xiii) Cooling medium for engine and charge air.

(xiv) Operating temperatures of coolant, head, and block.

(xv) Natural or forced cool-down and cool-down time.

(xvi) Canister loading.

(8) How did you validate your testing? For example, results from the following:

(i) Duty cycle regression statistics for each test interval.

(ii) Proportional sampling.

(iii) Drift.

(iv) Reference PM sample media in PM-stabilization environment.

(9) How did you calculate results? For example, results from the following:

(i) Drift correction.

(ii) Noise correction.

(iii) “Dry-to-wet” correction.

(iv) NMHC, CH₄, and contamination correction.

(v) NO_x humidity correction.

(vi) Brake-specific emission formulation—total mass divided by total work, mass rate divided by power, or ratio of mass to work.

(vii) Rounding emission results.

(10) What were the results of your testing? For example:

(i) Maximum mapped power and speed at maximum power.

(ii) Maximum mapped torque and speed at maximum torque.

(iii) For constant-speed engines: no-load governed speed.

(iv) For constant-speed engines: test torque.

(v) For variable-speed engines: maximum test speed.

(vi) Speed versus torque map.

(vii) Speed versus power map.

(viii) Brake-specific emissions over the duty cycle and each test interval.

(ix) Brake-specific fuel consumption.

(11) What fuel did you use? For example:

(i) Fuel that met specifications of subpart H of this part.

(ii) Alternate fuel.

(iii) Oxygenated fuel.

(12) How did you field test your engine? For example:

(i) Data from paragraphs (c)(1), (3), (4), (5), and (9) of this section.

(ii) Probes, dilution, transfer lines, and sample preconditioning components.

(iii) Batch storage media (such as the bag material or PM filter material).

(iv) Continuous or batch sampling for each emission.

(v) Raw or dilute sampling; any dilution air background sampling.

(vi) Cold-start, hot-start, warmed-up running.

(vii) Intake and dilution air absolute pressure, temperature, dewpoint.

(viii) Curb idle transmission torque value.

(ix) Warm idle speed value, any enhanced idle speed value.

(x) Date, time, and location of test (e.g., identify the testing laboratory).

(xi) Proportional sampling validation.

(xii) Drift validation.

(xiii) Operating temperatures of coolant, head, and block.

(xiv) Vehicle make, model, model year, identification number.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37339, June 30, 2008; 79 FR 23807, Apr. 28, 2014]

Subpart H—Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

(a) *General.* For all emission measurements, use test fuels that meet the specifications in this subpart, unless the standard-setting part directs otherwise. Section 1065.10(c)(1) does not apply with respect to test fuels. Note

that the standard-setting parts generally require that you design your emission controls to function properly when using commercially available fuels, even if they differ from the test fuel. Where we specify multiple grades of a certain fuel type (such as diesel fuel with different sulfur concentrations), see the standard-setting part to determine which grade to use.

(b) *Fuels meeting alternate specifications.* We may allow you to use a different test fuel (such as California Phase 2 gasoline) if it does not affect your ability to show that your engines would comply with all applicable emission standards using the fuel specified in this subpart.

(c) *Fuels not specified in this subpart.* If you produce engines that run on a type of fuel (or mixture of fuels) that we do not specify in this subpart, you must get our written approval to establish the appropriate test fuel. See the standard-setting part for provisions related to fuels and fuel mixtures not specified in this subpart.

(1) For engines designed to operate on a single fuel, we will generally allow you to use the fuel if you show us all the following things are true:

(i) Show that your engines will use only the designated fuel in service.

(ii) Show that this type of fuel is commercially available.

(iii) Show that operating the engines on the fuel we specify would be inappropriate, as in the following examples:

(A) The engine will not run on the specified fuel.

(B) The engine or emission controls will not be durable or work properly when operating with the specified fuel.

(C) The measured emission results would otherwise be substantially unrepresentative of in-use emissions.

(2) For engines that are designed to operate on different fuel types, the provisions of paragraphs (c)(1)(ii) and (iii) of this section apply with respect to each fuel type.

(3) For engines that are designed to operate on different fuel types as well as continuous mixtures of those fuels, we may require you to test with either the worst-case fuel mixture or the most representative fuel mixture, unless the standard-setting part specifies otherwise.

(d) *Fuel specifications.* Specifications in this section apply as follows:

(1) Measure and calculate values as described in the appropriate reference procedure. Record and report final values expressed to at least the same number of decimal places as the applicable limit value. The right-most digit for each limit value is significant unless specified otherwise. For example, for a specified distillation temperature of 60 °C, determine the test fuel's value to at least the nearest whole number.

(2) The fuel parameters specified in this subpart depend on measurement procedures that are incorporated by reference. For any of these procedures, you may instead rely upon the procedures identified in 40 CFR part 80 for measuring the same parameter. For example, we may identify different reference procedures for measuring gasoline parameters in 40 CFR 80.46.

(e) Two-stroke fuel/oil mixing. For two-stroke engines, use a fuel/oil mixture meeting the manufacturer's specifications.

(f) *Service accumulation and field testing fuels.* If we do not specify a service-accumulation or field-testing fuel in the standard-setting part, use an appropriate commercially available fuel such as those meeting minimum specifications from the following table:

TABLE 1 OF § 1065.701—EXAMPLES OF SERVICE-ACCUMULATION AND FIELD-TESTING FUELS

Fuel category	Subcategory	Reference procedure ¹
Diesel	Light distillate and light blends with residual ...	ASTM D975
	Middle distillate	ASTM D6985
	Biodiesel (B100)	ASTM D6751
Intermediate and residual fuel	All	See § 1065.705
Gasoline	Automotive gasoline	ASTM D4814
	Automotive gasoline with ethanol concentration up to 10 volume %..	ASTM D4814
Alcohol	Ethanol (E51–83)	ASTM D5798
	Methanol (M70–M85)	ASTM D5797
Aviation fuel	Aviation gasoline	ASTM D910

TABLE 1 OF § 1065.701—EXAMPLES OF SERVICE-ACCUMULATION AND FIELD-TESTING FUELS—
Continued

Fuel category	Subcategory	Reference procedure ¹
Gas turbine fuel	Gas turbine	ASTM D1655
	Jet B wide cut	ASTM D6615
	General	ASTM D2880

¹ ASTM specifications are incorporated by reference in § 1065.1010.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37339, June 30, 2008; 73 FR 59341, Oct. 8, 2008; 75 FR 23057, Apr. 30, 2010; 79 FR 23807, Apr. 28, 2014]

§ 1065.703 Distillate diesel fuel.

(a) Distillate diesel fuels for testing must be clean and bright, with pour and cloud points adequate for proper engine operation.

(b) There are three grades of #2 diesel fuel specified for use as a test fuel. See

the standard-setting part to determine which grade to use. If the standard-setting part does not specify which grade to use, use good engineering judgment to select the grade that represents the fuel on which the engines will operate in use. The three grades are specified in the following table:

TABLE 1 OF § 1065.703—TEST FUEL SPECIFICATIONS FOR DISTILLATE DIESEL FUEL

Property	Unit	Ultra low sulfur	Low sulfur	High sulfur	Reference procedure ¹
Cetane Number	—	40–50	40–50	40–50	ASTM D613.
Distillation range:					
Initial boiling point	°C	171–204	171–204	171–204	ASTM D86.
10 pct. point .....	.....	204–238	204–238	204–238	ASTM D86.
50 pct. point .....	.....	243–282	243–282	243–282	ASTM D86.
90 pct. point .....	.....	293–332	293–332	293–332	ASTM D86.
Endpoint .....	.....	321–366	321–366	321–366	ASTM D86.
Gravity	°API	32–37	32–37	32–37	ASTM D4052.
Total sulfur, ultra low sulfur	mg/kg	7–15	.....	.....	See 40 CFR 80.580.
Total sulfur, low and high sulfur	mg/kg .....	.....	300–500	800–2500	ASTM D2622 or alternates as allowed under 40 CFR 80.580.
Aromatics, min. (Remainder shall be paraffins, naphthenes, and olefins).	g/kg	100	100	100	ASTM D5186.
Flashpoint, min.	°C	54	54	54	ASTM D93.
Kinematic Viscosity	cSt	2.0–3.2	2.0–3.2	2.0–3.2	ASTM D445.

¹ ASTM procedures are incorporated by reference in § 1065.1010. See § 1065.701(d) for other allowed procedures.

(c) You may use the following non-metallic additives with distillate diesel fuels:

- (1) Cetane improver.
- (2) Metal deactivator.
- (3) Antioxidant, dehazer.
- (4) Rust inhibitor.
- (5) Pour depressant.
- (6) Dye.
- (7) Dispersant.
- (8) Biocide.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37340, June 30, 2008; 73 FR 59341, Oct. 8, 2008; 75 FR 23057, Apr. 30, 2010; 77 FR 2464, Jan. 18, 2012; 79 FR 23807, Apr. 28, 2014]

§ 1065.705 Residual and intermediate residual fuel.

This section describes the specifications for fuels meeting the definition of residual fuel in 40 CFR 80.2, including fuels marketed as intermediate fuel. Residual fuels for service accumulation and any testing must meet the following specifications:

(a) The fuel must be a commercially available fuel that is representative of the fuel that will be used by the engine in actual use.

(b) The fuel must be free of used lubricating oil. Demonstrate this by showing that the fuel meets at least one of the following specifications.